

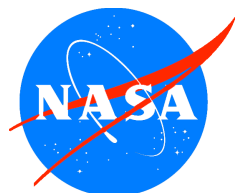
NASA SCIENCE MISSION DIRECTORATE

*Earth Science Division
Applied Sciences Program
Public Health Program Element
FY2007-2011 Plan*



FINAL DRAFT

Date: 11/9/2006



*Expanding and accelerating the realization of economic and societal
benefits from Earth system science, information, and technology*

FINAL DRAFT

NASA Earth Science Division - Applied Sciences Program

Public Health Program Element

TABLE OF CONTENTS

I. PURPOSE AND SCOPE	1
II. OBJECTIVES	3
III. PUBLIC HEALTH ISSUES, RELATED RESEARCH AND DECISION SUPPORT TOOLS	5
IV. PROJECTS AND ACTIVITIES	9
A. SOLICITED PROJECTS	
B. DIRECTED PROJECTS	
C. CONGRESSIONALLY DIRECTED PROJECTS	
V. PROGRAM MANAGEMENT & CROSSCUTTING SOLUTIONS SUPPORT	21
A. PROGRAM MANAGEMENT ACTIVITIES	
B. CROSSCUTTING SOLUTIONS SUPPORT	
VI. BUDGET: FY2007-2011	24
VII. PROGRAM MEASURES	27
APPENDICES	28
A. PROGRAM ELEMENT PARTNERS	
B. ROADMAP	
C. ACRONYMS	

The Applied Sciences Program websites contain additional information about the program and this program element:

Applied Sciences Program:	http://science.hq.nasa.gov/earth-sun/applications
Public Health Element:	http://science.hq.nasa.gov/earth-sun/applications/theme11.htm
Project Tracking & Reporting:	http://aiwg.gsfc.nasa.gov

NASA Science Mission Directorate – Applied Sciences Program

Public Health Program Element Plan: FY 2007 - 2011

I. Purpose and Scope

The NASA Applied Sciences Program collaborates with partner organizations to enhance the application of NASA Earth science research results to serve issues of national priority. The desired outcome is for partner organizations to use project results, such as prototypes and benchmark reports, to enable the sustained, operational use of Earth science products and enhance their decision support capabilities.

NASA's Public Health Program Element extends products derived from science information, models, technology, and other capabilities into partners' decision support tools for public health, medical, and environmental health issues. The Public Health Program foci of partnerships with the public health practice community are their decision support systems known as Epidemiologic Surveillance Systems in the areas of:

- infectious disease
- public health tracking and information networks
- environmental health
- emergency response and preparedness (including food/nutrition security)

NASA collaborates with the professional public health community that is responsible for surveillance to understand and respond to factors in the environment that adversely impact the health of the American public. These factors include disease vectors, air and water contaminants, ambient temperature extremes, ultra-violet radiation and a myriad of other factors associated with public health problems. NASA's Public Health Program Element uses Earth observing instruments, advanced communication technology, high speed computing capabilities, data products, and predictive models of Earth system phenomena associated with the occurrence of disease to assist partners in enhancing their surveillance systems. International health is included in the scope of the Program as it represents a national health concern through its potential impact on American public health, economics, and national security. To this end, the program has strong connections with the Group on Earth Observations (GEO), the Interagency Working Group on Earth Observations (IWGEO), the World Health Organization (WHO), the International Society for Photogrammetry and Remote Sensing (ISPRS), and The Observing-System Research and Predictability Experiment (THORPEX) program under the auspices of the World Meteorological Organization (WMO). The program also collaborates with the U.S. State Department.

The decision support structure of the public health community is based partially upon health information provided by epidemiologic surveillance. According to the Centers for Disease Control and Prevention (CDC), epidemiologic surveillance may be described as "the ongoing and systematic collection, analysis, and interpretation of health data in the process of describing and monitoring a health event." As outlined by CDC, the primary attributes of a surveillance system that combine to determine its usefulness for decision-makers include:

- simplicity: structure and ease of operation
- flexibility: adaptable to changing needs or operating conditions
- acceptability: willingness of individuals and organizations to participate
- sensitivity: proportion of disease detected, ability to detect epidemics
- predictive value positive: proportion of identified cases truly having the condition
- representativeness: accurately describes occurrence over time, distribution by place and person

- timeliness: speed or delay between steps in the system

A useful surveillance system enables the continual collection of data for monitoring disease trends and outbreaks for a public health response. While this data may be used for scientific investigations, research is not the primary purpose of a surveillance system. Surveillance systems are designed primarily to support decision makers.

In general, the incorporation of Earth science observations into measurement systems and models is intended to improve their accuracy with regard to spatial and temporal dimensions of the phenomena they represent. These improvements enhance the representative attribute of surveillance systems. The Public Health Program plans to enhance the ability of surveillance systems to assimilate observations and predictions of weather, climate and environmental risk factors to predict disease events. In surveillance terms, the goal for integrating Earth science and Public Health observations is to represent more accurately these environmental risk factors in terms of the populations potentially affected by them. The Public Health Program addresses four of the seven attributes of a reliable surveillance system: simplicity, flexibility, acceptability, and timeliness. These five attributes of partner surveillance systems will be enhanced by ensuring interoperability of Earth system science measurements with other important public health functions identified in the evaluation, verification, and validation stages of the collaboration. NASA partners with federal agencies, and regional and national organizations that have public health responsibilities as well as mandates to support public health practitioners. Primary partners are the CDC, the National Institutes of Health (NIH), the U.S. Environmental Protection Agency (EPA), the Department of Health and Human Services (DHHS), the National Oceanic and Atmospheric Administration (NOAA), and the Department of Defense (DOD). The Program includes international organizations and activities with appropriate U.S. partners.

The Public Health Program's activities relate to the Air Quality, Coastal Management, Ecological Forecasting, Homeland Security, and Water Management Program Elements. Through its activities, the Program provides results that support the White House National Science and Technology Council's (NSTC) Subcommittee on Environment and Health. The Subcommittee reports to three major NSTC committees, including the Committees on Science, Environment and Natural Resources, and Homeland Security. The Program strongly supports interagency programs on Climate Change Science and Technology (CCSP, CCTP) due to the impacts of climate change on public health (including food/nutrition security, air quality, extreme weather events, and vector-borne disease). The Program also strongly supports the interagency working groups under the OSTP Ocean Action Plan. Priority Earth-Sun science measurements for the Public Health Program include those derived from sensors on: Aura, Terra, Aqua, EO-1, Landsat 7, TOMS-EP, CALIPSO, and SRTM. NASA research has meaningful information on environmental factors associated with disease phenomena. The project plans associated with the Public Health Program identify specific sensors, measurements, and models, and state specific activities with the partners to extend Earth science results.

This plan covers projects, objectives, and activities for FY07-11. In FY07-11, the Program's priorities focus on: evolving observation and prediction products for an identified suite of decision support tools, identifying and evaluating new Public Health decision support tools, and implementing risk management and network development plans.

II. Objectives: FY2007-2011

All National Applications Program Elements are aligned to the NASA Strategic Plan and the agency's objectives as expressed in the NASA Integrated Budget and Performance Document (IBPD) and the Performance Assessment Rating Tool (PART).

Specifically, the NASA Public Health Program Element pursues the following short and near term objectives:

Short-term Objectives: FY 2007

Complete benchmark report on EPHTN/HELIX

Evaluate expansion of EPHTN-type applications in the USA and internationally

Complete V&V report part II on Malaria Modeling/GSAT

Complete V&V report on PHAiRS/RSVP

Complete benchmark report on ArboNET/PSS

Complete evaluation report on CMVSRP/ArboNET

Complete evaluation report on FEWSNET/MEWS and begin V&V activities

Complete final report on GeoMedStat

Evaluate expanded collaboration with DHHS and DHS

Expand portfolio of projects through the ROSES 07 solicitation

Expand portfolio of projects through the NASA Rapid Prototyping Capability (under development)

Near-term Objectives: FY08-FY11

2008

Complete benchmark reports on PHAiRS/RSVP and Malaria Modeling/GSAT

Complete benchmark report on FEWSNET/MEWS

Complete V&V report on CMVSRP/ArboNET

Expand EPHTN-type applications if found appropriate from FY07 evaluation

Evaluate further collaboration with DOD

Complete evaluation reports on projects selected in ROSES 07

Expand portfolio of projects through the ROSES 08 solicitation

2009

Complete benchmark report on CMVSRP/ArboNET

Complete V&V reports on projects selected in ROSES 07

Complete evaluation reports on projects selected in ROSES 08

Expand portfolio of projects through the ROSES 09 solicitation

2010

Complete benchmark reports on projects selected in ROSES 07

Complete V&V reports on projects selected in ROSES 08

Complete evaluation reports on projects selected in ROSES 09

Expand portfolio of projects through the ROSES 10 solicitation

2011

Complete benchmark reports on projects selected in ROSES 08

Complete V&V reports on projects selected in ROSES 09

Complete evaluation reports on projects selected in ROSES 10

Expand portfolio of projects through the ROSES 11 solicitation

III. Public Health Issues, Related Research, and Decision Support Tools

Potential Public Health Issues: FY07-FY11

The program will continue to focus on development of a Public Health Tracking/Information Network -- including epidemiological modeling, rapid prototyping, uncertainty, and preparation for future sensors (NPP, NPOESS, GPM, and Glory)

The Public Health program themes are expected to remain similar. Sub-themes will evolve to address new DSSs, emerging infectious disease and environmental health threats, and to bring in new partners. The following are expected to be emphases of ROSES 07:

- Emergency Response/Preparedness (Bioterrorism)
- Avian Influenza (H5N1)
- Asthma

The Program will continue alignment with US GEO (through the US GEO User Working Group), CCSP, and the working groups associated with implementation of the Ocean Action Plan.

The Public Health program also plans \$35K in program management for support to conferences and working groups through the year. These program management funds include (but are not limited to) the following activity:

The Univ. of Wisconsin/NCAR Summer Institute

The purpose of this 2-week summer institute at NCAR is to provide: 1) a uniquely interdisciplinary 1-week Climate/Health Symposium geared to scientists from multiple disciplines, as well as young scientists and advanced graduate students; and 2) a 1-week Climate Change/Health Research Summit geared to scientists working in this field to discuss and compare state-of-the-art methods. The workshop will help ensure that health researchers are aware of the types of climate (and land use) databases that are available, as well as their optimal application. Statistics that are most relevant to climate/health study also will be taught, with the ultimate goal being to advance the quality of research on health impacts of climate change.

Project Manager: John Haynes - HQ

Centers: All Science Mission Dir. Centers

Timeframe: Summer 2008, bi-annual

Partners: CDC, NCAR, Univ. of Wisconsin

Earth science Products: All capabilities and data are relevant

Other Apps.:

Deliverables: Summer institute and report and network connections (including connections to DEVELOP and University of Mississippi)

Priority Decision Support Tools

The following represent priority Decision Support Tools the program focuses on in the near-term.

EPHTN/HELIX:

CDC has statutory responsibility for developing and managing EPHTN / HELIX. The system is designed to establish a national network of local, state, and federal public health agencies that tracks trends in priority chronic diseases. Around 2009, when fully functional, the EPHTN will be a national early warning system for the rapid identification of health threats, such as toxic chemical releases, including long-term data collection on harmful exposures to be used in future studies of new environment-disease correlations.

ArboNET / Plague Surveillance System (PSS):

Plague is an infectious disease caused by the bacteria, *Yersinia pestis*. Plague surveillance is a CDC priority because it is a Class A disease and, by law, all occurrence of cases or suspected cases must be reported. Plague is also monitored for its potential as a bioterrorist agent. Plague prevention and response efforts are underway at regional, state and local levels through the CDC-sponsored Arbonet / Plague Surveillance System. Arbonet is a passive surveillance system managed by the CDC to collect and archive data to study and operationally monitor regional and national arthropod-borne viral disease trends. The CDC, participating health departments, Department of Defense (DOD) and the US Geological Survey (USGS) are primary users of ArboNET. Earth System science models (e.g., the GHCN, the GMAO, and the GSFC Plague Algorithm) have the potential to provide information on plague vector habitats that enhance ArboNET forecasts of outbreak conditions.

Malaria Modeling and Surveillance/GSAT:

The CDC and DOD are interested in utilizing new technologies and in developing methodologies for monitoring and modeling infectious diseases. Malaria is a high priority infectious disease target for domestic agencies, such as CDC and DOD, as well as international health entities, such as the World Health Organization and the Pan American Health Organization. Malaria affects nearly 1,600 Americans each year and kills an estimated 3 million people worldwide, many of whom are children. In addition, malaria costs African nations approximately \$12 billion in economic productivity losses. The health and economic consequences of malaria make it a destabilizing phenomenon. Both CDC and DOD currently are developing decision support tools to better predict and respond to malaria. Earth science data and modeling have the potential to enhance these tools by providing new information on vector habitats and environmental conditions that precede malaria outbreaks. The Global Situational Awareness Tool (GSAT) is an environmental planning tool owned and operated by the U.S. Air Force Strategic Operations Command (AFSOC). It is designed to assist military decision makers with global troop deployments by reducing time and coordination burdens. It provides environmental safety and health information to AFSOC planners and decision makers. Malaria is a disease of significant interest to the GSAT operators specifically, and military decision makers in general.

REASoN - Public Health Applications in Remote Sensing (PHAiRS)/Rapid Syndrome Validation Project (RSVP):

The RSVP (and its next-generation follow-on -- the Syndrome Reporting Information System (SYRIS)) is a surveillance system that tracks disease syndromes and was developed by the Sandia National Laboratory. The system is operated in conjunction with local and state health departments and other public health entities. RSVP is designed to identify infectious disease outbreaks in the earliest possible stages and to alert public health officials to these events. Earth system science observations and modeling have the capacity to provide predictive value to the system by identifying environmental conditions that precede naturally occurring, chronic and infectious disease events.

Famine/Malaria Early Warning (FEWS NET/MEWS):

The U.S. Agency for International Development (USAID) provides humanitarian assistance to vulnerable populations facing slow onset disasters, due to drought or conflict, and rapid onset emergencies stemming from floods, landslides, earthquakes, tsunamis, and other disasters. The project's goal is to enhance USAID

humanitarian programs by integrating NASA Earth observation and modeling results into famine and malaria early warning systems (FEWS NET/MEWS). By using NASA MODIS-AVHRR NDVI, TRMM-GPCPCMAP precipitation, MODIS Atmosphere humidity, and NCAR reanalysis I and II products to calculate quasiglobal (60S to 60N) standardized NDVI, precipitation, relative humidity, total precipitable water, and projected estimations of these indices one to four months in advance using climatology and a simple statistical approach, the project aims to significantly strengthen famine decision support. It is proposed to produce and distribute five operational indices based on global NASA data products: a standardized NDVI index (SNI), a standardized precipitation index (SPI), a standardized relative humidity index (SRI), and a standardized total precipitable water index (SQI). Standardization and broadening of the already used NDVI and precipitation to include humidity and precipitable water will significantly improve the USAID's ability to detect and quantify reductions in food production due to drought and flooding. Short-lag projections of indicators will enable decision makers to look one to four months into the future. Satellite observations will play a strong role in making these projections. NASA Earth observation and modeling results will also be integrated into early warning systems for prevention and containment of malaria epidemics. Precipitation, temperature and other environmental variables are highly correlated with malaria transmission rates. The project will use NASA precipitation estimates derived from TRMM and Aqua AMSR, temperature and precipitation fields from MM5 and NASA's fvGCM, and downscaling techniques and landscape analysis employing elevation data from GTOPO30 and SRTM to improve the timeliness and geographic specificity of malaria early warning products. Outbreaks of malaria can seriously threaten people who are already malnourished, without shelter, and whose normal livelihoods have been disrupted. Developing country organizations typically have limited resources for malaria control, and when there are malaria epidemics, available staff and supplies are overwhelmed. Improved early warning can make possible more optimal allocation and deployment of limited resources, helping to reduce rates of infection. As a consequence, U.S.-funded humanitarian assistance can be more efficient and cost-effective, and human suffering can be significantly reduced.

Three Dimensional Air Quality System (3D-AQS):

This project focuses on the application of aerosol-related NASA Earth Science observations into key DSSs used by the U.S. EPA for air quality management, air quality forecasting, and public health tracking. Metrics and budget for this project are tracked under the Air Quality Program.

GeoMedStat:

GeoMedStat is an active and evolving DSS. It was developed by UMMC based on open source codes of the Real-time Outbreak and Disease Surveillance (RODS) DSS that originated at the Univ. of Pittsburgh. GeoMedStat determines disease outbreaks using both spatial and temporal variables. Based on historical data, anomalies beyond the threshold for a specific period and space are determined and warnings are generated for possible outbreak.

California Mosquito-borne Virus Surveillance and Response Plan (CMVSRP) and the Arbovirus Surveillance Network (ArboNET):

The CMVSRP is a decision support system (DSS) currently used by the California Department of Health Services (CDHS) and 53 mosquito and vector control districts (MVCDs) to make intervention decisions regarding West Nile (WNV), St. Louis encephalitis (SLEV) and western equine encephalomyelitis (WEEV) viruses. Data on eight environmental and epidemiological factors are ranked and averaged within the CMVSRP model to produce a real-time estimate of virus risk. CMVSRP users rely on these estimates to make management decisions on pesticide applications for vector control, funding and effort levels for public education and media outreach, and coordination with physicians and emergency services personnel. Within the CMVSRP, the current system used to rank climate variation is not integrated well with mosquito and virus surveillance

data. ArboNET is a national reporting and information system operated by the Centers for Disease Control and Prevention (CDC) to document and visualize arbovirus activity reported by state and local health departments. Users include state and local health departments nationwide who rely on ArboNET, in combination with other data sources, to make management decisions related to the initiation of public outreach and media campaigns to encourage the use of preventative measures that may reduce the risk of mosquito-borne virus transmission. This project will focus its initial efforts on enhancing the CMVSRP by effectively integrating NASA models and real-time remote sensing data (including observations from MODIS, AMSR-E, Landsat, and NOAA AVHRR) to accurately define and map current and future mosquito activity and virus transmission risk. Mosquito abundance and risk forecasts based on remote sensing data and validated at a regional scale are likely to be extrapolative to the western United States. Forecasting skill will be evaluated and improved through retrospective simulations using data gathered by ArboNET. Once adequate forecasting skill is developed, the system may be integrated into the suite of maps available through the CDC WN website to enhance current decision support systems for tracking vector-borne diseases.

Department of Health and Human Services Secretary's Command Center (DHHS/SCC):

The Department of Health and Human Services' Secretary's Command Center was created to provide a focal point for public health information and intelligence to the Secretary of the Department of Health and Human Services (DHHS). Located in Washington, DC, the Secretary's Command Center (SCC) coordinates the activities of the DHHS with international, local, state, and federal public health authorities. Since its establishment in December 2002, the SCC's innovative design, information architecture, and business plan have become the benchmarks for similar operations centers being developed for international and federal agencies. The SCC has workstations dedicated for the Secretary, Deputy Secretary, and Assistant Secretary for Public Health Preparedness; for the Surgeon General; and for other division leaders and liaisons from other agencies. The use of the Internet protocol system creates an interoperable system of computers, radios, and telephones. Geospatial systems allow tracking and plotting of events and incidents and their relay to DHHS preparedness and response activity managers/coordinators. Through the SCC, the DHHS monitors developing public health emergencies through as many as 4,000 news media outlets across North, Central, and South America; Europe; and the Middle East. The SCC can monitor local television stations from up to 10 cities at a time to observe how breaking events are being reported across the country. Discussions with the DHHS suggest that benefits would result from the integration of NASA Earth science satellite observations and model predictive capabilities into the SCC. The DHHS and NASA are in the initial stages of formulating a Memorandum of Understanding between the two agencies to formalize this relationship.

IV. Project and Activities

The Public Health Program Element conducts projects to support the program's goal and objectives. The projects fall into two types: Solicited Projects and Directed Projects. The respective Project Managers and teams are responsible for developing project plans, managing the activities, and reporting issues and results. Generally, the projects involve the following activities:

Develop and nurture partnerships with appropriate coastal organizations;
Identify and assess partners' coastal management responsibilities, plans, and decision support tools and evaluate capacity of Earth science results to support the partners;
Validate & verify application of Earth science results with partners, including development of prototypes;
Cooperate with partners to document the performance and value of Earth science results relative to partners' benchmarks and to support adoption into operational use; and,
Communicate results & partners' achievements to appropriate coastal communities and stakeholders.

Plans, status, and results for each project are available through: <http://aiwg.gsfc.nasa.gov>

A. Solicited Projects

All National Applications Program Elements authorize peer-reviewed projects to support each element's goal and objectives. To secure funding and authorization to undertake activities supporting NASA and the Applied Sciences Program, project teams are responsible for developing project plans and managing the activities. The project plans specify the Earth observations, models, and other research results to extend to decision support tools as well as the activities to produce appropriate deliverables. The plans integrate contributions from appropriate partners, NASA Centers and other contributors from the community of practice. Projects are expected to extend the benefits of NASA research results to the maximum extent possible, including the use observations from sensors on: Aura, Terra, Aqua, TRMM, CALIPSO, and Jason. Projects should also focus on the future incorporation of observations from Glory, NPP, NPOESS, and GPM.

Project: PHAiRS/RSVP (REASoN)					Solicitation	
<p>The purpose of this project is to assess the potential for observations from MODIS, TOMS-EP, Landsat, TRMM, and EO-1 to improve the performance of the DOE’s Rapid Syndrome Validation Project (RSVP) and its next-generation follow-on, the Syndrome Reporting Information System (SYRIS) used in identifying environmental conditions (for example, dust storms) that precede naturally occurring, chronic, and infectious disease events for environmental health issues.</p> <p>The goal of this project is to evaluate, verify/validate, and benchmark Earth science measurements for use in an existing public health syndromic surveillance system. FY07: verify and validate dust measurements and models for use in respiratory diseases addressed by RSVP. FY08: Benchmark dust measurements and models and extend RSVP/SYRIS by integrating additional Earth system science results.</p>				Budget (\$K)		
				FY07	700	
Project Monitor and Center	Other NASA Centers	Timeframe	Partners	FY08	300	
Carol Watts/MSFC		FY03 - FY08	DOE, UNM, UoA	FY09	0	
				FY10	0	
				FY11	0	
Principal Investigator(s)		Stan Morain and William Sprigg				
Earth Science Products	mission: Terra, Aqua, Landsat-7, TOMS-EP, TRMM, EO-1 sensor: MODIS products: data on incoming solar radiation, surface temperature, atmospheric constituents, air quality, soil moisture models: GMAO Catchment Land Surface Model, Dust Regional Atmospheric Model (DREAM)			Other Apps.		
Deliverables	Description		End Date	IBPD Metric #		
	Project Plan					
	Evaluation Report		10/31/200			
	Design & Implement					
	Verification and Validation Report		9/30/2007			
	Benchmark Report		9/30/2005			
	Final Benchmark Report		9/30/2008			
	Quarterly written reports					
Notes:	Earth Science Products cont’d: NDVI, wind speed, and direction, trace gas concentration in the troposphere, aerosol concentration, rain rate and amount. Models: MAESTRO/MAESTRA, Catchment Land Surface Model, NCEP/ETA, DREAM, NARAC/ERS, HOTMAC/RAPTAD, COAMPS					

Project: Enhancing USAID Famine and Malaria Early Warning with NASA Earth Science Results (FEWS NET/MEWS)					Solicitation	
<p>The purpose of this project is to assess the potential for observations from MODIS and AMSR to improve the performance of USAID’s famine and malaria early warning systems (FEWSNET/MEWS) used in famine and malaria risk assessment and humanitarian support for infectious disease issues.</p> <p>The U.S. Agency for International Development (USAID) provides humanitarian assistance to vulnerable populations facing slow onset disasters, due to drought or conflict, and rapid onset emergencies stemming from floods, landslides, earthquakes, tsunamis, and other disasters. The project's goal is to enhance USAID humanitarian programs by integrating NASA Earth observation and modeling results into famine and malaria early warning systems (FEWS NET/MEWS). By using NASA MODISAVHRR NDVI, TRMM-GPCP-CMAP precipitation, MODIS Atmosphere humidity, and NCAR reanalysis I and II products to calculate quasi-global (60S to 60N) standardized NDVI, precipitation, relative humidity, total precipitable water, and projected estimations of these indices one to four months in advance using climatology and a simple statistical approach, the project aims to significantly strengthen famine decision support.</p>				Budget (\$K)		
				FY07	467	
Project Monitor and Center	Other NASA Centers	Timeframe	Partners	FY08	0	
Carol Watss (MSFC)	GSFC	FY05 - FY07	USGS, USAID	FY09	0	
				FY10	0	
				FY11	0	
Principal Investigator(s)						
Earth Science Products	mission: Aqua, TRMM, SRTM sensor: MODIS, AMSR products: CMAP precipitation, Atmosphere humidity, Temperature and precipitation fields from the MM5 models: fvGCM			Other Apps.		
Deliverables	Description		End Date	IBPD Metric #		
	Project Plan					
	Evaluation Report		3/30/2007			
	Design & Implementation					
	Verification & Validation		9/30/2007			
	Benchmark Report		9/30/2008			
Notes:						

Project: GeoMedStat				Solicitation	
<p>The purpose of this project is to assess the potential for observations from MODIS and OMI to improve the performance of the University of Mississippi Medical Center's GeoMedStat used in asthma surveillance, prediction, and intervention for environmental health issues.</p> <p>GeoMedStat is an active and evolving DSS. It was developed by UMMC based on open source codes of the Real-time Outbreak and Disease Surveillance (RODS) DSS that originated at the Univ. of Pittsburgh. GeoMedStat determines disease outbreaks using both spatial and temporal variables. Based on historical data, anomalies beyond the threshold for a specific period and space are determined and warnings are generated for possible outbreak. The objective of this project is to enhance GeoMedStat for asthma surveillance, prediction, and intervention by integrating it with NASA research results.</p>				<i>Budget (\$K)</i>	
				FY07	0
<i>Project Monitor and Center</i>	<i>Other NASA Centers</i>	<i>Timeframe</i>	<i>Partners</i>	FY08	0
Fazlay Faruque/UMMC	MSFC	FY05 - FY07	MDoH, MDEQ, CDC	FY09	0
				FY10	0
				FY11	0
<i>Principal Investigator(s)</i>					
<i>Earth Science Products</i>	mission: <i>Terra, Aqua, Aura</i> sensor: <i>MODIS, OMI</i> products: models: <i>Large Scale Eddy Simulation Model</i>			<i>Other Apps.</i>	
<i>Deliverables</i>	<u>Description</u> Project Plan Evaluation Report Design & Implementation Verification & Validation Benchmark Report Final Report		<u>End Date</u> 9/30/2007	<u>IBPD Metric #</u>	
<i>Notes:</i>					

Project: CMVSRP/ArboNET					Solicitation	
<p>The purpose of this project is to assess the potential for observations from MODIS, AMSR-E, and NOAA AVHRR to improve the performance of California Department of Health Services and CDC's CMVSRP/ArboNET used in mosquito-borne virus risk assessments for infectious disease issues.</p> <p>This project will incorporate NASA models and remote sensing data into a risk assessment model that coalesces environmental, mosquito abundance, and encephalitis virus measurements from the California Mosquito-borne Virus Surveillance and Response Plan (CMVSRP) and the Arbovirus Surveillance Network (ArboNET). The CMVSRP is a decision support system (DSS) currently used by the California Department of Health Services (CDHS) and 53 mosquito and vector control districts (MVCDs) to make intervention decisions regarding West Nile (WNV), St. Louis encephalitis (SLEV) and western equine encephalomyelitis (WEEV) viruses. Data on eight environmental and epidemiological factors are ranked and averaged within the CMVSRP model to produce a real-time estimate of virus risk. CMVSRP users rely on these estimates to make management decisions on pesticide applications for vector control, funding and effort levels for public education and media outreach, and coordination with physicians and emergency services personnel. Within the CMVSRP, the current system used to rank climate variation is not integrated well with (continued in Notes)</p>				Budget (\$K)		
				FY07	340	
Project Monitor and Center	Other NASA Centers	Timeframe	Partners	FY08	339	
Carol Watts/MSFC	ARC	FY06- FY08	CDHS, CDC	FY09	0	
				FY10	0	
				FY11	0	
Principal Investigator(s)		William Reisen				
Earth Science Products	mission: Terra, Aqua, Landsat sensor: MODIS, AMSR-E, NOAA AVHRR products: mosquito abundance, virus transmission risk factors models: TOPS, UC-Davis CVEC			Other Apps.		
	Deliverables	Description	End Date	IBPD Metric #		
Project Plan						
Evaluation Report		9/30/2007				
Design & Implementation						
Verification & Validation		9/30/2008				
Benchmark Report		9/30/2009				
Notes: mosquito and virus surveillance data. ArboNET is a national reporting and information system operated by the Centers for Disease Control and Prevention (CDC) to document and visualize arbovirus activity reported by state and local health departments. Users include state and local health departments nationwide who rely on ArboNET, in combination with other data sources, to make management decisions related to the initiation of public outreach and media campaigns to encourage the use of preventative measures that may reduce the risk of mosquitoborne virus transmission.						

Project: Future ROSES Solicitations					Solicitation	
<p>The purpose of this project is to assess the potential for future NASA Earth science observations and model predictive capabilities to improve the performance of partner organization's decision support tools used in management and policy decisions for public health issues.</p>					<p><i>Budget (\$K)</i></p>	
					FY07	0
<i>Project Monitor and Center</i>	<i>Other NASA Centers</i>	<i>Timeframe</i>	<i>Partners</i>	FY08	500	
Carol Watts/MSFC	ALL	FY08 - FY11	Multiple	FY09	1000	
				FY10	1500	
				FY11	1500	
<i>Principal Investigator(s)</i>						
<i>Earth Science Products</i>	mission: <i>all</i> sensor: <i>all</i> products: <i>all</i> models: <i>all</i>			<i>Other Apps.</i>		
<i>Deliverables</i>	<u>Description</u> Project Plan Evaluation Report Design & Implementation Verification & Validation Benchmark Report			<u>End Date</u> <u>IBPD Metric #</u>		
<p><i>Notes:</i></p>						

B. Directed Projects

The program supports directed projects to serve issues of critical strategic and tactical importance, including near-term opportunities with potential for high-return in developing relationships with partner organizations and where timeliness is critical to maintain.

Project: EPHTN/HELIX				Directed Project	
<p>In FY 07, the purpose of this project is to assess the potential for observations from MODIS and ASTER to improve the performance of the CDC'S Environmental Public Health Tracking Network (EPHTN) used in determining atmospheric particulate matter concentrations and links to respiratory distress for environmental health issues.</p> <p>The goal of this project is to verify, validate and benchmark Earth science measurements for routine use in EPHTN/HELIX.</p> <p>FY07: Benchmarking data and modeling inputs. Expand number and scope of Earth science inputs.</p> <p>Also in FY07, the project will evaluate the continuous integration of NASA data on a national level with public health data. To extend existing and develop new national models for continuous satellite data integration to enhance public health, the project will enter into collaboration with the UAB School of Public Health to enhance the REGARDS project (Reasons for Geographic and Racial Differences in Stroke). (Continued in Notes)</p>				<i>Budget (\$K)</i>	
				FY07	480
<i>Project Manager and Center</i>	<i>Other NASA Centers</i>	<i>Timeframe</i>	<i>Partners</i>	FY08	412
Dale Quattrochi and	MSFC	FY02 - FY09	CDC, EPA, UAB	FY09	400
				FY10	0
				FY11	0
<i>Principal Investigator(s)</i>				<i>Other Apps.</i>	
<i>Earth Science Products</i>	mission: Aqua, Terra sensor: MODIS, ASTER products: Surface Temp, models: Large Scale Eddy Simulation Model (LES)				
<i>Deliverables</i>	<i>Description</i>	<i>End Date</i>	<i>IBPD Metric #</i>		
	Project Plan	10/1/2005			
	Evaluation Report	10/31/2004			
	Design & Implementation				
	V&V Report	9/30/2006	6ASP11.A		
	Benchmark Report	9/30/2007			
	Initial Benchmark Report	9/30/2005			
<i>Notes:</i>	This project will be an integral and pivotal part of demonstrating and sustaining continual flow of NASA data and products into tracking geographic and environmental health effects of the type pursued under the EPHTN project since 2003. The project will also evaluate providing the knowledge, technology, and system models to expand NASA's public health efforts to global scales starting with collaboration in the Mediterranean with the Israeli CDC. If successful, this project may continue through FY 09 either through directed funding and/or competitive selection.				

Project: Arbonet/Plague Surveillance System				Directed Project	
<p>The purpose of this project is to assess the potential for observations from MODIS, SRTM, Landsat, and TRMM to improve the performance of the CDC'S ArboNET/Plague Surveillance System used in forecasting risk for plague outbreaks in the desert Southwest for infectious disease issues.</p> <p>The goal of this project is to benchmark Earth science measurements and models output for routine use in ArboNET.</p> <p>FY07: Benchmark report on enhancements to the ArboNET decision support tool for plague surveillance.</p>				<i>Budget (\$K)</i>	
				FY07	180
<i>Project Manager and Center</i>	<i>Other NASA Centers</i>	<i>Timeframe</i>	<i>Partners</i>	FY08	0
Compton Tucker	GSFC	FY02 - FY07	CDC	FY09	0
				FY10	0
				FY11	0
<i>Principal Investigator(s)</i>				<i>Other Apps.</i>	
<i>Earth Science Products</i>	mission: <i>SRTM, Terra, Aqua, Landsat 4,5,7, TRMM</i> sensor: <i>MODIS</i> products: Surface Temp (MOD11), Veg. Index (MOD13), Fract tree cover (MOD44B), Land Surface Topo, Land Cover models: <i>GSFC Plague Algorithms, GMAO, GHCN</i>				
<i>Deliverables</i>	<u><i>Description</i></u> Project Plan Evaluation Report Design & Implementation V&V Report Benchmark Report	<u><i>End Date</i></u> 10/1/2005 9/30/2005 9/30/2006 9/30/2007	<u><i>IBPD Metric #</i></u> 6ASP11.A		
<i>Notes:</i>					

Project: Malaria/GSAT				Directed Project																				
<p>The purpose of this project is to assess the potential for observations from MODIS, ASTER, Landsat, and EO-1 to improve the performance of the Air Force Special Operations Command (AFSOC) Global Situational Awareness Tool (GSAT) used in determining risk for malaria transmission in theaters in which the US military is operating for infectious disease issues.</p> <p>The goal of this project is to benchmark Earth science measurements for use in malaria habitat, transmission, and risk models destined for use in infectious disease surveillance systems such as GSAT.</p> <p>FY07-FY08: V&V Report Part II and benchmark report on enhancements to GSAT.</p>				Budget (\$K)																				
				FY07	500																			
Project Manager and Center	Other NASA Centers	Timeframe	Partners	FY08	493																			
Richard Kiang	GSFC	FY02 - FY08	CDC, DOD	FY09	0																			
				FY10	0																			
				FY11	0																			
Principal Investigator(s)				Other Apps.																				
Earth Science Products	mission: EO1, Terra, Landsat 7, Aqua, sensor: ASTER, MODIS products: radiance values, radiance values, land cover, models: GMAO Atmosphere Model, GHCN																							
Deliverables	<table><thead><tr><th>Description</th><th>End Date</th><th>IBPD Metric #</th></tr></thead><tbody><tr><td>Project Plan</td><td>10/1/2005</td><td></td></tr><tr><td>Evaluation Report</td><td>9/30/2005</td><td></td></tr><tr><td>Design & Implementation</td><td></td><td></td></tr><tr><td>V&V Report</td><td>9/30/2006</td><td></td></tr><tr><td>Benchmark Report</td><td>9/30/2008</td><td></td></tr><tr><td>V&V Report Part II</td><td>9/30/2007</td><td></td></tr></tbody></table>					Description	End Date	IBPD Metric #	Project Plan	10/1/2005		Evaluation Report	9/30/2005		Design & Implementation			V&V Report	9/30/2006		Benchmark Report	9/30/2008		V&V Report Part II
Description	End Date	IBPD Metric #																						
Project Plan	10/1/2005																							
Evaluation Report	9/30/2005																							
Design & Implementation																								
V&V Report	9/30/2006																							
Benchmark Report	9/30/2008																							
V&V Report Part II	9/30/2007																							
Earth Science Products cont'd: Global Historical Climatology Network Model (GHCN)																								
Notes:																								

Project: DHHS SCC				Directed Project	
<p>The purpose of this project is to assess the potential for observations and products from the GSFC DAAC to improve the performance of the DHHS Secretary's Command Center (SCC) used as the nation's nerve center during a public health crisis for emergency preparedness and response issues.</p> <p>The goal of this project is to benchmark Earth system science products for use in the DHHS SCC decision support systems.</p> <p>FY07: Continue work on MOU between NASA and DHHS. If this milestone is reached, begin evaluation/V&V work. However, no funds will be dedicated to this project until an MOU is completed.</p>				<i>Budget (\$K)</i>	
				FY07	0
<i>Project Manager and Center</i>	<i>Other NASA Centers</i>	<i>Timeframe</i>	<i>Partners</i>	FY08	0
Carol Watts	MSFC, GSFC	FY04 - FY08	DHHS	FY09	0
				FY10	0
				FY11	0
<i>Principal Investigator(s)</i>				<i>Other Apps.</i>	
<i>Earth Science Products</i>	mission: <i>All</i> sensor: <i>All</i> products: <i>GSFC DAAC products</i> models:				
<i>Deliverables</i>	<u><i>Description</i></u> Project Plan Evaluation Report Design & Implementation Verification and Validation Report Benchmark Report	<u><i>End Date</i></u> 10/1/2005 9/30/2007 9/30/2007 9/30/2008	<u><i>IBPD Metric #</i></u>		
<i>Notes:</i>					

Project: Future Directed Public Health Projects				Directed Project	
The purpose of this project is to assess the potential for future NASA Earth science observations and model predictive capabilities to improve the performance of partner organization's decision support tools used in management and policy decisions for public health issues.				Budget (\$K)	
				FY07	0
Project Manager and Center	Other NASA Centers	Timeframe	Partners	FY08	0
Multiple	ALL	FY08 - FY11	Multiple	FY09	305
				FY10	715
				FY11	580
Principal Investigator(s)				Other Apps.	
Earth Science Products	mission: all sensor: all products: all models: all				
Deliverables	<u>Description</u> Project Plan Evaluation Report Design and Implementation Verification & Implementation Benchmark Report				
<u>End Date</u> <u>IBPD Metric #</u>					
Notes:					

C. Congressionally-Directed Activities

The program oversees Congressionally-directed activities associated with public health issues. The project teams for Congressionally-directed activities are responsible for developing, managing, and reporting on technically-credible and appropriately-budgeted projects aligned with the NASA Applied Sciences Program objectives. The Public Health program team interacts with the recipients to align their activities appropriately and facilitates interaction with the program's partners and other investigators.

There are no Congressionally-Directed Activities in FY07 for the Public Health Program Element

V. Program Management & Crosscutting Solutions Support

A. Program Management Activities

The Public Health program conducts activities that contribute to the overall management, advocacy, and success of the program. Activities include studies and assessments in informal planning, interagency working group participation, publications and journal articles, support for conferences and workshops, program team meetings, and other related endeavors.

Project: Workshops, Conferences, etc.					Project Management	
Activities of the Public Health Working Group and co-sponsorship of Public Health related conferences and workshops.					<i>Budget (\$K)</i>	
					FY07	35
<i>Project Manager and Center</i>	<i>Other NASA Centers</i>	<i>Timeframe</i>	<i>Partners</i>	FY08	35	
John Haynes	All	FY07 - FY11	Univ. of WI, CDC, NCAR, SEDAC, etc.	FY09	35	
				FY10	35	
				FY11	35	
<i>Principal Investigator(s)</i>				<i>Other Apps.</i>		
<i>Earth Science Products</i>	mission: sensor: products: <i>All data and capabilities are relevant</i> models:					
<i>Deliverables</i>	<u><i>Description</i></u> Project Plan		<u><i>End Date</i></u> 10/1/2005	<u><i>IBPD Metric #</i></u>		

B. Crosscutting Solutions Support

The program consists of functional elements that contribute to all of the National Applications activities. The intention is to have the performance of these functions leverage accomplishments, and therefore the apparent resource investment, to the greatest extent possible into the National Applications partnerships. These functions are: Geoscience Standards and Interoperability, Human Capital Development, Integrated Benchmark Systems, and Solutions Networks.

Integrated Benchmark Solutions

The Public Health program plans to utilize the Rapid Prototyping Capability that the Applied Sciences Program supports at various locations and NASA Centers to identify candidate configurations for possible integrated system solutions.

- FY07: Utilize the Rapid Prototyping Capability to identify 12 candidate configurations for possible integrated system solutions in Public Health.
- FY08: Utilize the Rapid Prototyping Capability to identify 12 candidate configurations for possible integrated system solutions in Public Health.
- FY09: Utilize the Rapid Prototyping Capability to identify 12 candidate configurations for possible integrated system solutions in Public Health.
- FY10: Utilize the Rapid Prototyping Capability to identify 12 candidate configurations for possible integrated system solutions in Public Health.
- FY11: Utilize the Rapid Prototyping Capability to identify 12 candidate configurations for possible integrated system solutions in Public Health.

Solutions Networks

The Public Health program plans to work with the Solutions Network activity to identify research results that may be candidates for Integrated System Solutions and/or priorities for Rapid Prototyping activities. The program expects to meet with Solutions Networks representatives on a quarterly basis to review the results that the representatives have identified.

DEVELOP

The Public Health program plans to pursue the following activities with the DEVELOP program:

- FY07: DEVELOP at LaRC will explore a project on asthma decision support enhancement in the Richmond-Norfolk, VA corridor in collaboration with partners such as the Virginia Department of Health. Also, public health projects at MSFC will utilize DEVELOP by having students work as an investment in our public health initiatives. These students will work in collaboration with UAB in integrating NASA remote sensing assets with data from REGARDS, to enhance the study's assessment of risks related to air quality, for increased probabilities of increased risk for high blood pressure and stroke.
- FY08: TBD
- FY10: TBD

GIO

Earth System Gateway is a "portal of portals" providing an access point through an Internet interface to all web-enabled NASA research results.

FY07: Work with all Public Health project partners to link the various decision support systems with the Earth System Gateway.

FY08: TBD

FY09: TBD

FY10: TBD

FY11: TBD

VI. Budget: FY07-11

The following table lists the Public Health Program budget for FY2007 - FY2011:

<u>Project</u>	<u>FY07 (\$K)</u>	<u>FY08 (\$K)</u>	<u>FY09 (\$K)</u>	<u>FY10 (\$K)</u>	<u>FY11 (\$K)</u>
EPHTN/HELIX	480	412	400	0	0
Arbonet/Plague Surveillance System	180	0	0	0	0
Malaria/GSAT	500	493	0	0	0
DHHS SCC	0	0	0	0	0
PHAiRS/RSVP (REASoN)	700	300	0	0	0
Workshops, Conferences, etc.	35	35	35	35	35
Enhancing USAID Famine and Malaria Early Warning with NASA ES Results (FEWS NET/ MEWS)	467	0	0	0	0
GeoMedStat	0	0	0	0	0
CMVSRP/ArboNET	340	339	0	0	0
Future ROSES Solicitations	0	500	1000	1500	1500
Future Directed Public Health Projects	0	0	305	715	580
Total = \$	2702	2079	1740	2250	2115

VII. Schedule and Milestones for Public Health

<i>Project</i>	<i>Start Date</i>	<i>Deliverable</i>	<i>End Date</i>
EPHTN/HELIX	FY02	Project Plan	10/1/2005
		Evaluation Report	10/31/2004
		Design & Implementation	
		V&V Report	9/30/2006
		Benchmark Report	9/30/2007
		Initial Benchmark Report	9/30/2005

<i>Project</i>	<i>Start Date</i>	<i>Deliverable</i>	<i>End Date</i>
Arbonet/Plague Surveillance System	FY02	Project Plan	10/1/2005
		Evaluation Report	9/30/2005
		Design & Implementation	
		V&V Report	9/30/2006
		Benchmark Report	9/30/2007

<i>Project</i>	<i>Start Date</i>	<i>Deliverable</i>	<i>End Date</i>
Malaria/GSAT	FY02	Project Plan	10/1/2005
		Evaluation Report	9/30/2005
		Design & Implementation	
		V&V Report	9/30/2006
		Benchmark Report	9/30/2008
		V&V Report Part II	9/30/2007

<i>Project</i>	<i>Start Date</i>	<i>Deliverable</i>	<i>End Date</i>
DHHS SCC	FY04	Project Plan	10/1/2005
		Evaluation Report	9/30/2007
		Design & Implementation	
		Verification and Validation	9/30/2007
		Benchmark Report	9/30/2008

<i>Project</i>	<i>Start Date</i>	<i>Deliverable</i>	<i>End Date</i>
PHAiRS/RSVP (REASoN)	FY03	Project Plan	
		Evaluation Report	10/31/2004
		Design & Implement	
		Verification and Validation	9/30/2007
		Benchmark Report	9/30/2005
		Final Benchmark Report	9/30/2008
		Quarterly written reports	

<i>Project</i>	<i>Start Date</i>	<i>Deliverable</i>	<i>End Date</i>
Workshops, Conferences, etc.	FY07	Project Plan	10/1/2005

<i>Project</i>	<i>Start Date</i>	<i>Deliverable</i>	<i>End Date</i>
Enhancing USAID Famine and Malaria Early Warning with NASA Earth Science Results (FEWS NET/MEWS)	FY05	Project Plan	
		Evaluation Report	3/30/2007
		Design & Implementation	
		Verification & Validation	9/30/2007
		Benchmark Report	9/30/2008

<i>Project</i>	<i>Start Date</i>	<i>Deliverable</i>	<i>End Date</i>
Future Directed Public Health Projects	FY08	Project Plan	
		Evaluation Report	
		Design and Implementation	
		Verification & Implementation	
		Benchmark Report	

<i>Project</i>	<i>Start Date</i>	<i>Deliverable</i>	<i>End Date</i>
GeoMedStat	FY05	Project Plan	
		Evaluation Report	
		Design & Implementation	
		Verification & Validation	
		Benchmark Report	
		Final Report	9/30/2007

<i>Project</i>	<i>Start Date</i>	<i>Deliverable</i>	<i>End Date</i>
CMVSRP/ArboNET	FY06	Project Plan	
		Evaluation Report	9/30/2007
		Design & Implementation	
		Verification & Validation	9/30/2008
		Benchmark Report	9/30/2009

<i>Project</i>	<i>Start Date</i>	<i>Deliverable</i>	<i>End Date</i>
Future ROSES Solicitations	FY08	Project Plan	
		Evaluation Report	
		Design & Implementation	
		Verification & Validation	
		Benchmark Report	

VIII. Program Measures

The Public Health Program Management Team uses performance measures to track progress, identify issues, evaluate projects, make adjustments, and establish results of the program element. The Program's goals and objectives state what the Program intends to achieve. These measures help monitor progress within and across specific activities to ensure the Program meets its goals and objectives. The Management Team analyzes these measures retrospectively in order to make adjustments proscriptively to the Program approach and objectives. The measures are in two categories: Program Management measures are internally focused to assess the activities within the Program. Performance measures are externally focused to assess if the program activities are serving their intended purpose. In general, the Public Health Program Manager uses these measures to evaluate the performance of activities conducted and sponsored by the Program, especially the projects. In addition, the Applied Sciences Program uses this information in preparing IBPD directions and PART responses.

Program Management Measures (Internal):

Inputs:

- 1) Potential issues and DST identified for public health – number, type, range
- 2) Eligible partners to collaborate with – number, type, range
- 3) Potential results/products identified to serve public health – number, type, range

Outputs:

- 1) Assessments or evaluations of DST – number, range
- 2) Assessments of Earth science results/products to serve DST – number, range
- 3) Agreements with partners – presence
- 4) Reports (evaluation, validation, benchmark) – number, type

Quality and Efficiency:

- 1) Earth System science results/products – number used per DST, ratio of utilized to potential
- 2) Agreements – ratio of agreements to committed partners
- 3) Reports – partner satisfaction, timeliness, time to develop
- 4) Reports – ratio of validations to potential products, ratio of benchmarks to validations

Performance and Results Measures (External):

Outcomes:

- 1) Earth science products adopted in DST – number, type, range; use in DST over time
- 2) Earth science products in use – ratio of products used by partners to reports produced
- 3) Partner & DST performance – change in partner DST performance, number and type of public recognition of use and value of Earth science data in DST

Impacts:

- 1) Partner value – change in partner metrics (improvements in value of partner decisions)

In addition to the stated measures, the Public Health Program Manager periodically requests an assessment of its plans, goals, priorities, and activities through external review. The Public Health Program Team uses these measures along with comparisons to programmatic benchmarks to support assessments of the Earth Science Applications Program (e.g. internal NASA reviews and OMB PART). In specific, the Public Health Program Manager uses comparisons to similar activities (i.e. program benchmarks) to evaluate its progress and achievements.

Appendix A: Program Element Partners

A. Program Management

Public Health Program Manager:
John Haynes, NASA Headquarters

- Responsibilities:
- Program development, strategy, plans, and budgets
 - Program representation and advocate issues to Science Mission Directorate management and beyond
 - Communication of Science Mission Directorate priorities and directives to Program team/network
 - Represent program on inter-agency organizations (CCSP, CENR, IWGEO)
 - Implementation of interagency agreements and partnerships
 - Monitoring metrics and performance evaluation

Public Health Deputy Program Manager:
Carol Watts, NASA Marshall Space Flight Center

- Responsibilities:
- Leadership on project plans, development, performance, and partnership relationships
 - Communication of project metrics, performance, status, and issues to Program Manager
 - Leadership and communication to team and network
 - Coordination between NASA Centers on Public Health activities

B. Public Health Network & Partners

The program element maintains a network of organizations and points-of-contact associated with coastal management activities.

Earth Science Division and NASA Center Partners

NASA Headquarters Science Mission Directorate

- Atmospheric Composition Theme..... Phil DeCola, NASA HQ
- Carbon Cycle and Ecosystems Theme Diane Wickland, NASA HQ
- Climate Variability and Change Theme Waleed Abdalati, NASA HQ
- Business and Budget..... Joan Haas, NASA HQ
- Geosciences Interoperability Office Myra Bambacus, NASA GSFC
- Earth Science Technology Office..... Azita Valinia, NASA GSFC

NASA Headquarters Exploration Mission Directorate

- Fundamental Space Biology..... Terry Lomax

NASA Headquarters Administration

- Chief Health and Medical Officer Richard Williams
- Chief Scientist John Grunsfeld

NASA Centers

- Ames Research Center (ARC) Louisa Beck
- Goddard Space Flight Center (GSFC) Shahid Habib
- Marshall Space Flight Center (MSFC) Dale Quattrochi
- Langley Research Center (LaRC) Richard Eckman

Federal Partners

Center for Disease Control (CDC)

- National Center for Environmental Health Judith Qualters, Pam Myers
- National Center for Infectious Diseases John Roehrer, Ken Gage
- National Center for Health Statistics Charles Croner

EPA

- Heat Island Reduction Initiative..... Eva Wong

NIH

- Fogarty International Center Joshua Rosenthal
- National Institute for Biomedical Imaging and Bioengineering
..... Roderic Pettigrew
- National Instit. of Environmental Health Sciences.....Allen Deary

Department of Defense

- Armed Forces Pest Management Board Richard Johnson
- Air Force Strategic Operations Command..... Steve Lufkin, Mike Applegate

Department of Energy

- Sandia National Laboratories Al Zelicoff
- Oak Ridge National Laboratories..... Budhendra Bhaduri

Department of Commerce

- NOAA Office of Global Programs..... Juli Trtanj

Department of Health and Human Services, Secretary's Command Center

- Geospatial Public Health Program.....CDR William Henriques

Department of State

- Bureau of Oceans and International
Environmental Affairs Fernando R. Echavarria
- USGS..... Steve Guptill

Regional Planning Organizations Partners

None.

International, National and Regional Organizations Partners

National Science and Technology Council

- Committee on Environment and Natural Resources

- Committee on Homeland Security
- Committee on Science
- Subcommittee on Environment and Health Ann Carlson

National Academy of Sciences

- National Research Council
- Board on Earth Sciences and Resources..... David Feary

National and Organizations and Professional Societies

- American Public Health Association (APHA)..... Lynn Schoen
- Association of State and Territorial Health Officials (ASTHO)
- Association of Schools of Public Health (ASPH) Allison Foster
- Council of State and Territorial Epidemiologists (CSTE)
- International City / County Management Association (ICMA)..... Elizabeth Stasiak
- National Association of City and County Health Officials (NACCHO)

International Organizations

- World Health Organization

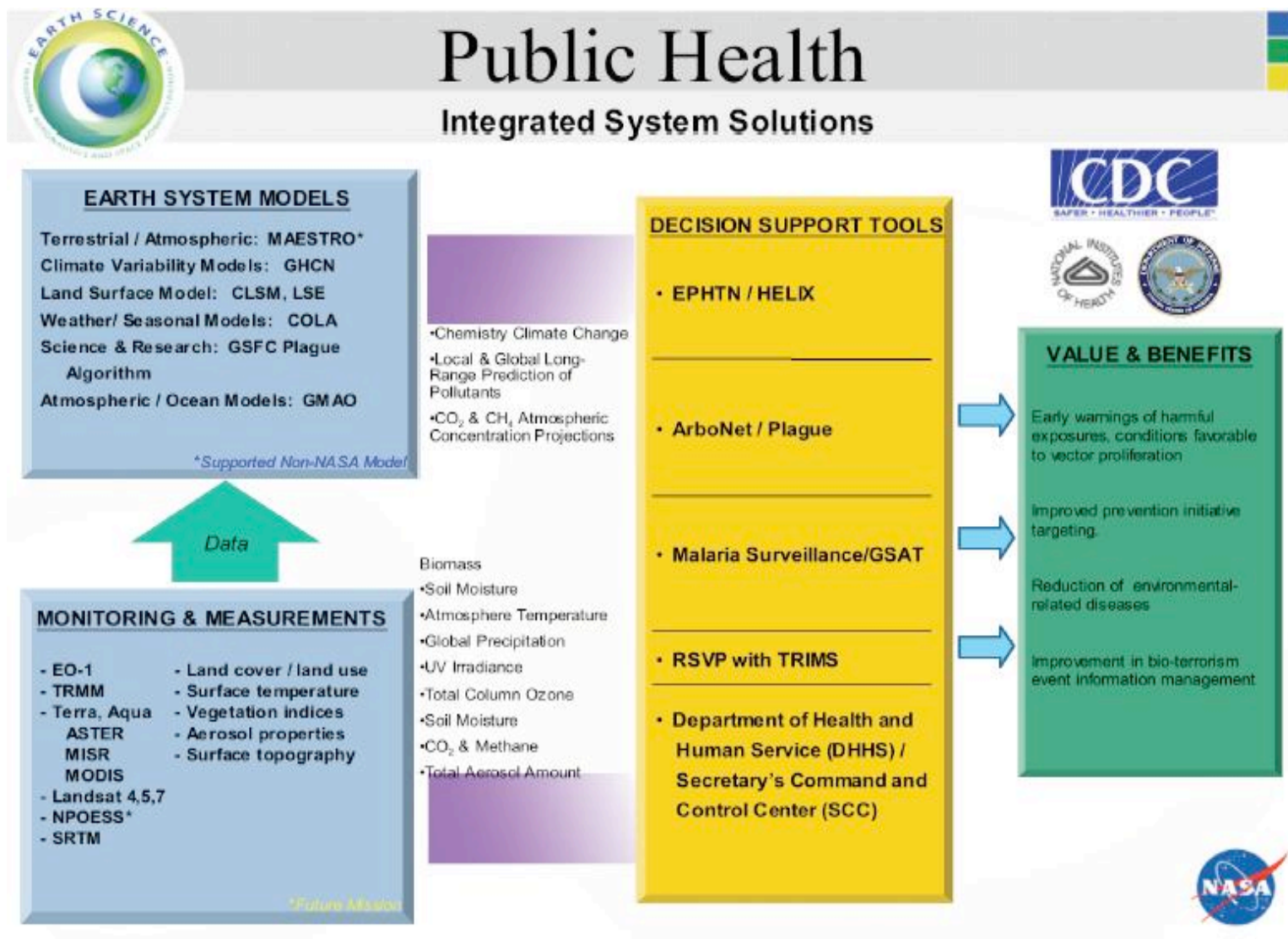
NASA Distributed Active Archive Centers and Earth-Sun science Science Laboratories

- GSFC Earth Science DAAC (GES DISC DAAC) Steve Kempler
- SEDAC..... Robert Chen

Appendix B: Roadmap

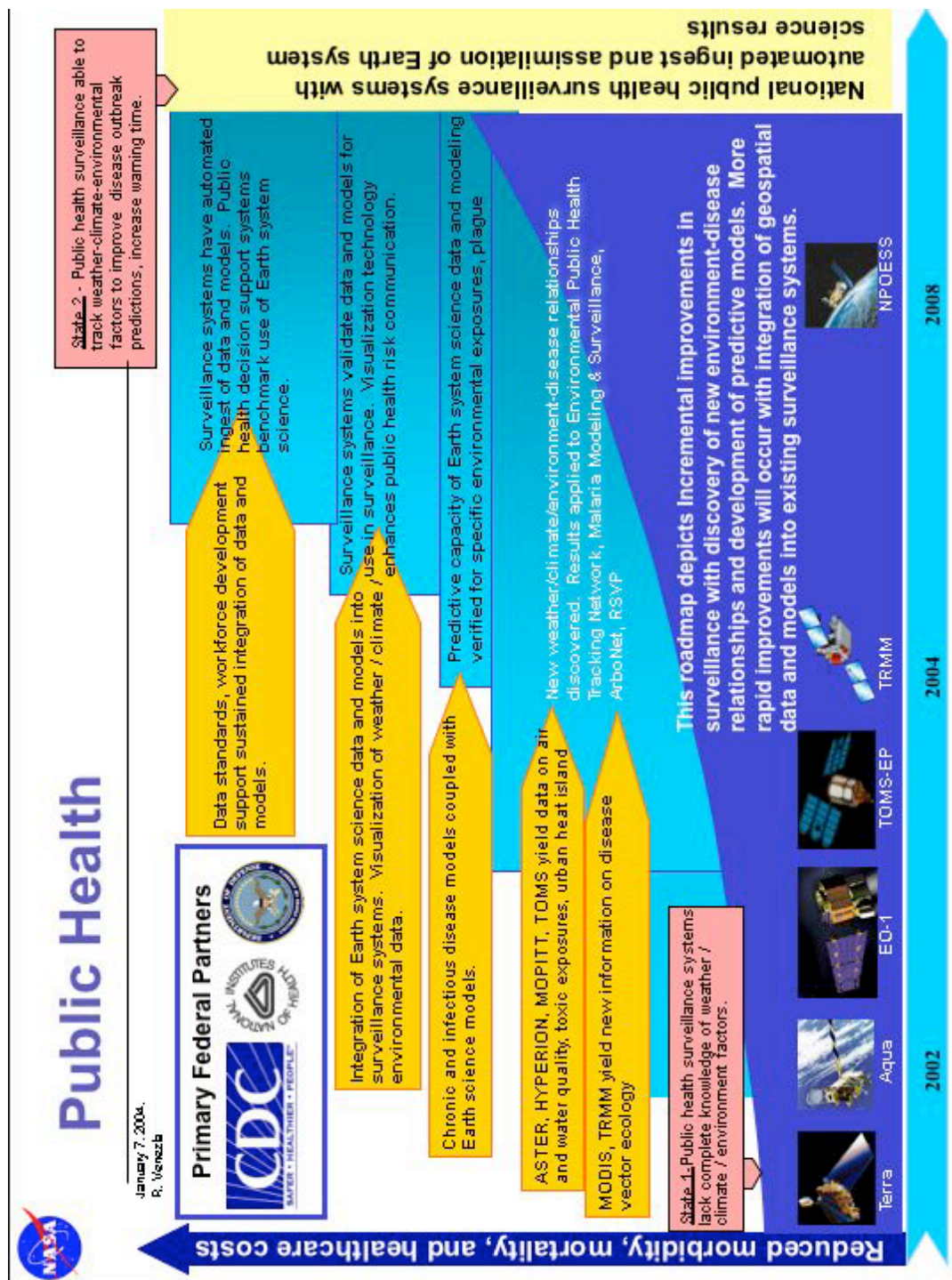
A. Integrated System Solutions Diagram

This figure illustrates the extension of Applied Sciences measurements, model products, and data fusion techniques to support the Public Health Program partners, their decision support tools, and the value and benefits of Earth science to society.



B. Roadmap

The Public Health Program draws upon technology and data from Earth system science missions such as Aqua, Landsat 7, NOAA-POES, Terra, TOMS, and TRMM. These and other systems provide information on environmental features that are correlated with disease risk factors or are risk factors themselves. The incorporation of Earth-Sun science research and models into public health surveillance systems enhances their ability to assimilate the role of weather, climate and environmental risk factors - in place and time - to predict disease events.



E. Acronyms and Websites

ACRONYMS:

ACRIMSAT	Active Cavity Radiometer Irradiance Monitor Satellite
AFSOC	Air Force Strategic Operations Command
AIWG	Applications Implementation Working Group
APHA	American Public Health Association
Arbonet	Passive Surveillance System (CDC Plague Surveillance System)
ARC	Ames Research Center
ASPH	Association of Schools of Public Health
ASTER	Advanced Spaceborne Thermal Emission and Reflectance Radiometer
ASTHO	Association of State and Territorial Health Officials
CCSP	Climate Change Science Program
CCTP	Climate Change Technology Program
CDC	Centers for Disease Control and Prevention
CENR	Committee on Environment and Natural Resources
CLSM	Catchment Land Surface Model
CSTE	Council of State and Territorial Epidemiologists
DAAC	Distributed Active Archive Center (Data Active Archive Center)
DEVELOP	No longer an acronym
DHHS	Department of Health and Human Services
DOC	US Department of Commerce
DOD	US Department of Defense
DOE	US Department of Energy
DREAM	Distance Routing Effect Algorithm for Mobility
DST	Decision Support Tool
EO-1	Earth Observing-1
EPA	US Environmental Protection Agency
EPHTN	Environmental Public Health Tracking Network
ERBS	Earth Radiation Budget Satellite
ERS	Emergency Response System
ESG	Earth-Sun Gateway
ETA	Event Tree Analysis
FEA	Federal Enterprise Architecture
FY	Fiscal Year
GES	Geospatial Extension Service
GEO	ad hoc Group on Earth Observations
GHCN	Global Historical Climatology Network Model
GIG	Global Information Grid
GMAO	Global Modeling and Assimilation Office
GSAT	Global Satellite Data Acquisition Team/Global Situational Awareness Tool
GSFC	Goddard Space Flight Center
HELIX	(High Energy Laser Iodine Extraction Code) Health and Environment Linked Information Exchange System
HOTMAC	High Order Turbulence Model For Atmospheric Circulations

IBPD	Integrated Budget and Performance Document
ICMA	International City/County Management Association
IWGEO	Interagency Working Group on Earth Observations
JCSDA	Joint Center for Satellite Data Assimilation
LaRC	Langley Research Center
LES	Large Scale Eddy Simulation Model
MAESTRA	European Spacecraft
MAESTRO	European Spacecraft
MEOC	Marine Emergency Operation Center /Marcus Emergency Operations Center
MODIS	Moderate Resolution Imaging Spectroradiometer
MS DoH	Mississippi Department of Health
MSFC	Marshall Space Flight Center
NACCHO	National Association of City and County Health Officials
NARAC	National Atmospheric Release Advisory Center
NAS	National Academy of Sciences
NASA HQ	NASA Headquarters
NASA	National Aeronautics and Space Administration
NCAR	National Center for Atmospheric Research
NCEP	National Centers for Environmental Prediction
NDVI	Normalized Difference Vegetation Index
NESDIS	National Environmental Satellite Data Information Service
NIH	National Institute of Health
NOAA	National Oceanic and Atmospheric Administration
NPOESS	National Polar-Orbiting Operational Environmental Satellite System
NSF	National Science Foundation
NSTC	National Science and Technology Council's
NWS	National Weather Service
OAR	Office of Oceanic and Atmospheric Research
OMB	Office of Management and Budget
OSSE	Observing System Simulation Experiment
OSTP	Office of Science and Technology Policy
PART	Program Assessment Rating Tool
POES	Polar Orbiting Environmental Satellites
PSS	Plague Surveillance System
R2O	Research to Operations Network
RAPTAD	Random Particle Transport and Diffusion
REASoN	Research, Education, and Applications Solutions Network
RSVP	Rapid Syndrome Validation Project
SCC	Secretary's Command Center
SEA	State Enterprise Architecture
SeaWiFS	Sea-viewing Wide-Field-of-View Sensor
SEDAC	Socio Economic Data and Application Center
SEEDS	Strategic Evolution of ESE Data Systems
SRTM	Shuttle Radar Topography Mission
SSC	Stennis Space Center

THORPEX	The Observing-System Research and Predictability Experiment
TOMS	Total Ozone Mapping Spectrometer
TOMS-EP	Total Ozone Mapping Spectrometer – Earth Probe
TRMM	Tropical Rainfall Measurement Mission
UCAR	University Corporation for Atmospheric Research
USGS	United States Geological Survey
VAccess	Virginia Access
WHO	World Health Organization
WMO	World Meteorological Organization

NASA Science Mission Directorate
Earth Science Division - Applied Science Program
Public Health Program Element

This document contains the Public Health Program Element Plan for FY 2007-2011.

This plan derives from direction established in the NASA Strategic Plan, Earth Science Enterprise and Space Science Enterprise Strategies, Earth Science Applications Plan, and OMB/OSTP guidance on research and development. The plan aligns with and serves the commitments established in the NASA Integrated Budget and Performance Document.

The Program Manager and the Applied Sciences Program Leadership have reviewed the plan and agree that the plan appropriately reflects the goals, objectives, and activities for the Program Element to serve the Applied Sciences Program, Earth Science Division, NASA, the Administration, and Society.

John Haynes
Program Manager, Public Health
Applied Sciences Program
NASA Earth Science Division

Date

Lawrence Friedl
Lead, National Applications
Applied Sciences Program
NASA Earth Science Division

Date

Teresa Fryberger
Director, Applied Sciences Program
NASA Earth Science Division

Date